Thus, in the conventional re-coding apparatus, the intra frame coder 20 and the SNR calculator 21 in the pre-processing portion are large in size, and the calculation amount also becomes large. Furthermore, although the detection procedure of an I-picture is specified, the detection procedure of a P-picture/B-picture is not specified.

SUMMARY OF THE INVENTION

Therefore, with the foregoing in mind, it is an object of the present invention to provide an apparatus for re-coding an image signal capable of enhancing a coding efficiency by detecting a picture type from an image signal in re-coding an image signal subjected to coding processing.

According to the present invention, an apparatus for re-coding an image signal which conducts re-coding processing using a decoded image signal subjected to coding processing as an input image signal and which is characterized by including: a DCT unit for subjecting the input image signal to DCT; a DCT coefficient counter for counting a feature amount on a picture basis using a DCT coefficient output from the DCT unit; a picture type detector for detecting a picture type in coding processing in a previous stage, using the feature amount output from the DCT coefficient counter, a coding control portion for determining coding parameters in re-coding in accordance with detection results of the picture type detector; and a coding portion for conducting re-coding processing, using the coding parameters determined by the coding control portion.

An apparatus for re-coding an image signal is characterized in that, the

picture type detector includes as a picture type to be detected, at least two of three kinds of picture types of an intra frame coding picture, a forward inter-frame predictive coding picture, and a bi-directional inter-frame predictive coding picture.

An apparatus for re-coding an image signal is characterized in that, the DCT coefficient counter counts as a feature amount, a sum of absolute values or a sum of squares on a frequency region basis of DCT coefficients, and that the picture type detector detects a picture type in accordance with variations with time of the sum of absolute values or the sum of squares thus obtained.

An apparatus for re-coding an image signal is characterized in that, the picture type detector detects, as an intra frame coding picture, a picture whose sum of absolute values or sum of squares in a high-frequency region is smaller than those of previous and subsequent pictures.

An apparatus for re-coding an image signal is characterized in that, the picture type detector detects, as an intra frame coding picture or a forward inter-frame coding picture, a picture whose sum of absolute values or sum of squares in a low-frequency region is larger than those of previous and subsequent pictures.

An apparatus for re-coding an image signal is characterized in that, the DCT coefficient counter counts, as a feature amount, the number of DCT coefficients whose absolute values are larger or smaller than previously set threshold values, and that the picture type detector detects a picture type in accordance with the obtained number

An apparatus for re-coding an image signal is characterized in that, the picture type detector detects, as an intra frame coding picture, a picture having a

smaller number of DCT coefficients whose absolute values are larger than threshold values and a picture having a larger number of DCT coefficients whose absolute values are smaller than threshold values.

An apparatus for re-coding an image signal is characterized in that, the coding control portion determines coding parameters using the picture type detected by the picture type detector.

An apparatus for re-coding an image signal is characterized in that, the coding control portion determines coding parameters, using an intended coding amount set in accordance with the picture type detected by the picture type detector.

These and other advantages of the present invention will become apparent to those skilled in the art upon reading and understanding the following detailed description with reference to the accompanying figures.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings:

FIG. 1 is a schematic block diagram showing a configuration of an apparatus for re-coding an image signal of Embodiment 1 according to the present invention;

FIG. 2 is a view illustrating frequency characteristics of sixty-four DCT coefficients output from a DCT unit 50 in FIG. 1;

FIG. 3 is a graph showing power values where horizontal components of DCT coefficients and vertical components thereof are both in a high region (shaded portions in FIG. 2);